

## Annual Southwest Center for Occupational and Environmental Health (SWCOEH) Field Trip

to Petra Nova—World's Largest Carbon Capture System  
at the NRG Energy W.A. Parish Power Plant



Southwest Center for Occupational  
and Environmental Health

Thompsons, TX, southwest of Houston, TX—Wednesday, April 12, 2017



For SWCOEH's annual field trip on April 12, 2017, SWCOEH faculty, staff, students, including [National Institute for Occupational Safety and Health \(NIOSH\) trainees](#) went to see [Petra Nova, the world's largest carbon capture system](#), at the NRG W.A. Parish power plant southwest of Houston. Petra Nova is the only system of its kind in the U.S., and the largest in the world.

[\\$1 billion has been invested into NRG's Carbon Capture and Sequestration Project](#) to lower coal plant emissions and battle climate change, which finally

became operational in January of 2017 after nearly a decade of planning.

The [W.A. Parish Electric Generation Station](#) is located on a 4,880 acre site purchased by NRG from the historic George Ranch southwest of Houston. It houses four coal-fired units and six gas-fired units. The plant generates electricity dispatched to North and Central Houston, Galveston, West Houston and Katy, as well as elsewhere throughout the State of TX like San Antonio and Dallas if there is excess power available on the smart grid. There are approximately 350-400 workers at the plant, mostly operators, who monitor operations 24 hours a day to ensure all systems operate in concert to generate power safely for millions of Texans.



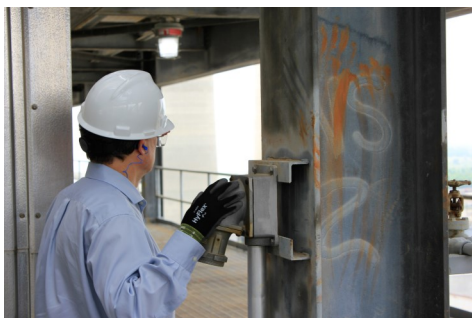
Petra Nova, the W.A. Parish plant's newest technology, cuts carbon dioxide (CO<sub>2</sub>) emissions on its unit by 90%, capturing a ton of CO<sub>2</sub> every 17 seconds. [The amount of CO<sub>2</sub> Petra Nova captures every year is equivalent to taking 350,000 cars off the road.](#) The CO<sub>2</sub> is transported along an [80 mile pipeline](#) from the plant to the oil field. The oil industry purchases the CO<sub>2</sub> from NRG for its oil recovery process where they pump it into the ground to loosen oil deposits in order to produce even more energy from Texas oil.



By incorporating [“clean coal” technologies](#), NRG’s W.A. Parish plant can reduce its emissions to stay competitive with the gas industry and with regards to community air regulations. The plant captures most of the emissions generated from coal combustion, including carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), mercury (Hg) and airborne particulate. Selective Catalytic Reduction (SCR) is a gas treatment used that can reduce NO<sub>x</sub> emissions. Flue-gas desulfurization (FGD) technologies are incorporated to remove sulfur dioxide (SO<sub>2</sub>).

Additionally, the plant injects powdered activated carbon (PAC) into the gas stream to control mercury pollution, which can be deposited on land or in water and end up in fish and consumed by people.

Baghouses containing 1000s of fabric filter bags analogous to vacuum cleaner bags remove particles suspended in plant gas emissions from burning coal known as “fly ash.” Airborne particulate matter is one of the [six common air pollutants regulated by the US EPA known as “criteria air pollutants.”](#) Injecting combustion exhaust at high-pressure into the bag house filtration system can remove over 99% of particulate matter emission that would otherwise contaminate the community air quality. Another benefit is that the particulate matter collected in the filter bags is not sent to the landfill, but rather sold to other industries. Fly ash is a low-cost alternative to cement, and the sandy material called “bottom ash” is used to make bricks and blocks.



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